



## Long-Term Ecological Monitoring Program Overview

### Introduction

Natural resource monitoring is the long-term systematic repetition of a specific resource survey and the analysis of those data to predict or detect natural or human-induced changes in resource conditions, and to determine if natural resource condition objectives are being achieved. If properly designed, monitoring provides information on linkages between changes in resource conditions and their causes. Monitoring is designed to provide feedback related to management actions and can serve to trigger further actions and to evaluate their effectiveness. It provides a rational basis for management actions.

### Management Needs

National parks are recognized as outdoor laboratories for studying ecological processes. As potential adverse impacts of human activities on the globe have become more widely recognized and politically acknowledged, national parks have become “canaries in the mine” for the biosphere. Natural systems in national parks provide the best indicators of ecological effects of anthropic perturbations such as air pollution, ozone depletion, and global warming. By developing sound technical information on park resources, the National Park Service is better positioned to actively participate in the management of those resources through its own actions and through broader state and Federal programs.



*Park volunteer assisting with forest monitoring tree measurements.*

### Current Status

Staff at Shenandoah National Park has been involved in monitoring since the early 1980s. Early monitoring efforts were directed at specific resource categories and were not coordinated with one another. In 1992, Shenandoah was selected to participate in what was known as the Prototype Monitoring Program of the National Park Service. Significant effort was put into trying to bring cohesion and direction to the park’s monitoring activities under this program. Major components of the program at this stage included air and water quality monitoring, gypsy moth monitoring, forest vegetation monitoring, rare plant monitoring, fisheries monitoring, and aquatic invertebrate monitoring. At the same time, the title “Long-Term Ecological Monitoring” was adopted by the program to reflect not only the intent for the program to endure but to indicate that it was to look holistically at the environment. Since 1992, the monitoring program has expanded and shifted as staffing, funding, and ecological circumstances have allowed. Other components of the program include bear monitoring, breeding bird surveys, monitoring avian survival and productivity, UVB monitoring, and hemlock crown health monitoring. The program has also adopted monitoring activities for specialized research or reconnaissance purposes. This has included air quality monitoring and Sudden Oak Death monitoring. Unfortunately, recent budget constraints are forcing park staff to reduce the scope and intensity of monitoring efforts.

In addition to funding and staffing difficulties, monitoring program reviews have pointed to a number of deficiencies including inadequate conceptual design and ecosystem model development, wide variation in the quality and currency of written protocols, and insufficient report. Recent effort has been placed on reporting and this is improving.

Beginning in about 1999, the National Park Service shifted emphasis away from the Prototype Monitoring Program and began funding Inventory and Monitoring Networks. Shenandoah is in the Mid-Atlantic Network. Although the Mid-Atlantic Network has a coordinator, full funding and operation of the network is not anticipated until 2006. During the next several years, staff at Shenandoah will be sorting out the relationship between the park’s monitoring program and monitoring efforts that will be implemented by the other parks in the network.



## Long-Term Ecological Monitoring Program Overview (continued...)

### References

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*Monitoring fish in park streams.*



*Plant identification at a forest monitoring plot.*



*Collecting aquatic macro-invertebrate habitat measurements.*